

BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, DC 20554

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Federal Communications Commission
Office of the Secretary

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In the Matter of)
)
Advanced Television Systems)
and Their Impact on the Existing)
Television Broadcast Service)
)
Review of Technical and)
Operational Requirements:)
Part 73-E, Television Broadcast)
Stations)
)
Reevaluation of the UHF Television)
Channel and Distance Separation)
Requirements of Part 73 of the)
Commission's Rules)

MM Docket No. 87-268

COMMENTS OF THE
MOBILE COMMUNICATIONS DIVISION
OF THE
TELECOMMUNICATIONS INDUSTRY ASSOCIATION
IN RESPONSE TO
TENTATIVE DECISION AND
FURTHER NOTICE OF INQUIRY

The Mobile Communications Division of the Telecommunications Industry Association (hereinafter the Division)¹ is pleased to submit these comments in response to the above-captioned proceeding.

¹ The Telecommunications Industry Association (TIA) is a full service national trade organization with nearly 600 members which provide materials, products, systems, distribution services and professional services to the telecommunications industry in the United States and countries around the world. TIA represents the telecommunications industry in association with EIA.

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EXECUTIVE SUMMARY

- o The need/availability of additional spectrum for assignment to television stations for ATV is now being studied. Any use of this spectrum, however, would not even commence for several years, and would not be substantial until at least the late 1990's.
- o Mobile services have need today for additional spectrum. This need is expected to grow and become critical in the early 1990's.
- o Fortunately, spectrum use options are available which can serve the needs of both the mobile and ATV services.
 - Several ATV proponents offer systems which can compatibly operate within the existing 6 MHz channels. This would permit the Commission's land mobile sharing proceeding to move ahead now.
 - Alternatively, in conjunction with 6 MHz compatible operation, the UHF television spectrum could be repacked, permitting approximately 100 MHz of spectrum to be made available for mobile use.
 - Zenith has disclosed a simulcast approach involving much reduced transmitter power, lesser co- and adjacent-channel distance separation requirements, and eliminated taboo restrictions. This approach entails use of an additional 6 MHz of spectrum per television station for simulcast operation. Phillips has an approach involving reduced

power which uses only 3 MHz of spectrum to augment the current NTSC channels. Both of these approaches allow the Commission to implement its Docket 85-172 land mobile sharing proposal.

- Alternatively, in conjunction with both the Zenith and Phillips approaches, the UHF television band could be repacked, permitting approximately 40-60 MHz of spectrum to be made available for mobile use.

INTRODUCTION

Some Division members participated in the Electronic Industries Association (EIA) Committee studying the ATV matter, and support the EIA/ATV response to this proceeding. We do, however, have additional views with regard to spectrum use that go beyond those set forth in the EIA/ATV Committee filing. In short, we believe that a number of spectrum options are available which offer significant promise for accommodation of both ATV needs and mobile² needs. Expeditious consideration of these options would result in a "win-win" situation, whereby ATV interests would be provided additional focus with regard to feasible and acceptable alternatives, and mobile interests would look forward to the timely availability of needed spectrum. These

² For convenience, mobile, as used herein includes private land mobile, cellular mobile, and cordless phones, although the latter is not normally considered a mobile service. Spectrum options involving Docket 85-172 apply only to private land mobile.

comments, then, identify and briefly discuss spectrum options which the Division believes to be worthy of serious and immediate consideration.

OVERVIEW

Spectrum availability and use is a factor which will materially influence the future of advanced television. Likewise, spectrum is a critical factor in the continued growth of various mobile services. Moreover, the efficiency with which the spectrum is used is a significant decisional factor; the various needs must be evaluated and balanced to serve best the overall interest of the public.

Use of spectrum for ATV will not occur in the short-term. It is difficult to estimate accurately when such use might be of significance, but it is unlikely that it will even commence prior to the several year timeframe, and will probably not be substantial until at least the ten year timeframe.

Mobile uses for this spectrum, on the other hand, exist in the present timeframe. Specifically, cellular mobile, private land mobile, and cordless telephones, which are services that by virtue of their non-stationary nature (i.e. mobile) must use radio spectrum, are experiencing substantial growth, and are expected to continue to do so.

Very significant spectrum efficient techniques have already been implemented on the part of these services, and more are planned in the future.

As examples: Current estimates of demand for cellular indicate a need for up to a 10:1 improvement in spectrum efficiency ---new digital systems, however, will provide only about a 3:1 or 4:1 improvement; historically, the private land mobile service is today using channels which are about one-tenth the bandwidth of those utilized in its early days, and further bandwidth reduction is expected. Even with these substantial spectrum use improvements for cellular mobile and private land mobile, however, additional spectrum capacity is required now, and the need will grow during the 1990's. Therefore, this spectrum need should be considered a prerequisite by the Commission in its deliberation on ATV. Similarly, cordless phones make very efficient use of spectrum; additional channels should also be considered for this use.

Fortunately, there is considerable opportunity to accommodate both the above described needs and those of ATV. One of our member companies has conducted preliminary studies to ascertain the degree of accommodation permitted by various ATV spectrum use approaches. These studies focused on the Northeast corridor of the United States where television station density is the greatest, but also "tested" these results for the entire country. The results of these studies for four approaches are described below. For more detail of the study approach, see the Appendix.

ATV OPERATION WITHIN EXISTING NTSC CHANNELS - 6 MHz ATV

Several ATV proponents utilize system designs which operate within and are compatible with the existing 6 MHz NTSC channels. If one of these designs is ultimately chosen for implementation, two spectrum approaches for television/mobile use are possible.

6 MHz ATV/Land Mobile Sharing

The use of the existing 6 MHz NTSC channels for ATV permits full accommodation for all television stations with no corresponding spectrum ramifications. Likewise, land mobile sharing as described in Docket 85-172 could be accommodated as proposed by the Commission, with the caveat that the ATV television receivers must be designed to achieve a similar degree of interference immunity as they now have. This approach could be the most expeditious option for all concerned interests.

6 MHz ATV Repack/Reallocation to Mobile

This approach involves repacking the UHF television spectrum by reassigning stations now in the top portion of the band to lower channels. This would permit the vacated spectrum to be reallocated to mobile uses.

The preliminary studies indicates that approximately 100 MHz of spectrum could be made available for reallocation under this approach. It would be necessary, however, to address the taboo constraints associated with the reassigned NTSC channels.

ATV REQUIRING MORE THAN 6 MHz - SIMULCAST OR AUGMENTATION

Heretofor, the well-known television taboos have severely limited more intense use of the UHF television spectrum. Recently one television receiver manufacturer, Zenith, disclosed an approach which offers promise for high

quality service, while operating with significantly reduced transmitter power compared to current NTSC stations. This reduced power, in conjunction with the specific Zenith design approach, permits effective elimination of the taboos. Furthermore, substantial reductions in co- and adjacent channel separation distances are possible. Thus, opportunity for more intense use of the UHF spectrum appears to be feasible. It should be noted that the Zenith system approach is not directly compatible with NTSC, i.e. it cannot be transmitted in conjunction with NTSC on the same channel. Rather, it utilizes a second 6 MHz channel on a simulcast basis.

Phillips has an approach which uses 3 MHz of spectrum to augment the existing 6 MHz NTSC channel. This approach uses reduced transmitter power, and is also expected to permit more intense use of the television spectrum.

Two possible television/mobile spectrum use approaches involving the above-discussed ATV systems are discussed below.

ATV Simulcast or Augmentation/Mobile Sharing

Because of the characteristics of the Zenith and Phillips systems, it will clearly be possible to accommodate many more television stations (i.e. simulcast or augmentation) in a given amount of spectrum. The number of additional stations that can be accommodated is, of course, a key question. The results of the aforementioned studies showed that:

- o All existing television stations can have either an additional 6 MHz channel assigned for simulcast or 3 MHz channel for augmentation.
- o The channels proposed for land mobile sharing by the Commission in Docket 85-172 can be allocated now.

This approach appears to satisfy the needs of both the television and mobile communities and clearly warrants immediate study and consideration.

ATV Simulcast or Augmentation with Repack/Reallocation to Mobile

An alternative approach, again involving an ATV system of the type disclosed by Zenith or Phillips, involves repacking the UHF television spectrum as previously described. Another preliminary study was conducted to ascertain the amount of spectrum potentially available for reallocation by implementing this repacking approach; the following information was developed:

- o All existing television stations can have an additional 6 MHz channel assigned for simulcast or 3 MHz channel for augmentation.
- o The taboos must be relaxed for the reassigned NTSC television stations.
- o Approximately 40-60 MHz of spectrum can be made available for reallocation.

This approach also appears to satisfy the needs of both the television and mobile communities. It is particularly attractive in that it provides a nationwide portion of spectrum for mobile use as does, of course, the previously discussed repack approach. Likewise, however, the taboo constraints for the reassigned NTSC channels must be addressed. This approach also warrants further study.

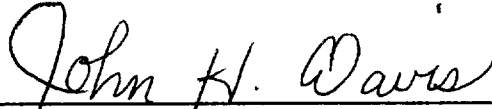
CONCLUSION

The above approaches to more efficient spectrum utilization each appear to have merit, but it is unclear as to which is the most desirable. Additional study must be conducted on each to gain more insight into which might be the best choice.

What is clear, however, is the following:

1. The Commission can and must act expeditiously to alleviate the spectrum shortage for the mobile services by reallocation of underused UHF television spectrum through options such as those discussed herein. This should be done prior to a final decision on the specific ATV standard that is ultimately chosen.
2. The television industry must be diligent in applying state-of-the-art technology, thereby permitting it to achieve spectrum efficiency which compares favorably with that demonstrated by the mobile radio industry over the last several decades.

Respectfully submitted,



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APPENDIX

PRELIMINARY STUDY APPROACH

Data Base

The FCC data base of U.S. television stations was used as the basis for the preliminary study. All stations with a license, construction permit, or application granted in the continental USA were placed on a VAX cluster of 8700 computers which were used to conduct the study. The exact coordinates of each station as given in the data base were used in the analysis.

Channel Assignment Algorithm

A candidate channel assignment list was computer generated by inputting the appropriate co- and adjacent-channel distance separation requirements, and in turn scanning all relevant UHF channels for those which met the given requirement. (For a simulcast approach, these channels would be used to supplement the existing NTSC channels; for the repack case, they would be used as substitutes for the moved channels.) Then a combination of computer channel selection, whereby the lowest channel from the candidate list was chosen, and manual selection was utilized to optimize the assignment. This process was executed for each needed channel assignment.

The co- and adjacent-channel distance separation requirements were those relevant to existing television-to-television assignments, Docket 18261 land mobile sharing, and Docket 85-172 land mobile sharing as appropriate. Also, the separations reported by Zenith in its report to the FCC Advisory Committee were used, modified to reflect a conservative antenna front-to-back ratio of 10 dB.

Study Area

The above-described analysis was conducted for the Northeast corridor of the United States, including the area from above Boston, Massachusetts to below Washington, DC. This area was determined to have the greatest density of television stations in the entire country. It is thus expected that the remainder of the U.S. can be readily accommodated with extra augmentation (simulcast) or substitute (repack) channels.

Assumptions with Regard to the Simulcast Approach

The aforementioned Zenith report to the FCC Advisory Committee indicated that:

- o The simulcast channel power can be 27 dB less than that for an NTSC channel;
- o the taboo restrictions can be effectively eliminated; and
- o co- and adjacent-channel D/U's of 6 dB and -30 dB (exclusive of antenna front-to-back ratio) are possible.

These factors were applied in the computer analysis.